

CLAIMS

1. A gas burner (1) comprising a main metal body (6), an inner lance (11) for combustible gas, at least two outer lances (10) for combustible gas, a single duct 5 (8) for the adduction of pre-heated air, a regulation system for the combustible gas, a refractory unit (30), characterized in that said gas burner (1) comprises a series of nozzles (20) for the injection of the pre-heated air into the combustion chamber, and in that, by 10 operating on the gas regulation system, it is possible to continuously switch from a flame functioning mode of the burner to a flameless functioning mode, the latter characterized by low emissions of polluting agents.

2. The gas burner (1) according to claim 1, 15 characterized in that said refractory unit (30) comprises a first region (31), a second region (32), a third region (33), which are concentric, said first region in turn comprising a series of calibrated holes (16) and preferably a free annular crown (119), the latter for allowing the passage of a sufficient 20 quantity of air suitable for preventing the overheating of the inner lance (11).

3. The gas burner (1) according to claim 2, characterized in that said series of nozzles (20) for 25 the air is housed in the second region (32).

-18-

4. The gas burner (1) according to claim 2, characterized in that said series of nozzles (20) comprises ten nozzles, and in that said series of calibrated holes (16) comprises three calibrated holes.

5 5. The gas burner (1) according to claim 2, characterized in that said first region comprises a cavity (34) communicating with the combustion chamber and into which the air from the series of calibrated holes flows together with the combustible gas injected 10 through the inner lance (11).

6. The gas burner (1) according to claim 2, characterized in that the first region (31) houses a flame detector in the housing (18) and the ignition device situated in the housing (17) of the burner (1).

15 7. The gas burner (1) according to claims 3 or 4, and 5, characterized in that the holes of said series of calibrated holes (16) are at an equal distance along a coaxial circumference with the inner lance (11) and lying on the bottom of the cavity (34) of the first 20 region (31).

8. The gas burner (1) according to claims 1 to 4, characterized in that the nozzles of said series of nozzles (20) are situated at an equal distance along a coaxial circumference with the inner lance (11) and 25 lying on a base surface of the second region (32).

-19-

9. The gas burner according to claim 1, characterized in that said burner (1) comprises at least two pass-through holes (21) for housing said at least two outer side lances (10).

5 10. The gas burner (1) according to claims 2 and 9, characterized in that said at least two pass-through holes (21) are situated at an equal distance along a coaxial circumference with the inner lance (11) and lying on a base surface of the third region (33).

10 11. The gas burner (1) according to claims 3 and 4, characterized in that said the total outflow section of air from the series of calibrated holes (16) with respect to the total outflow section of air from the series of nozzles (20) has a ratio ranging from 0.01 to 15 0.9.

12. The gas burner (1) according to claim 11, characterized in that the total outflow section of air from the series of calibrated holes (16) with respect to the total outflow section of air from the series of nozzles (20) has a ratio ranging from 0.05 to 0.5.

20 13. The gas burner (1) according to claims 3 and 7, characterized in that once a ratio (x) has been defined, equal to the distance between the barycentre of a first hole of the series of calibrated holes (16) 25 and the barycentre of a second hole of the series of

-20-

calibrated holes (16), divided by a minimum diameter selected from a hydraulic diameter of the first hole and a hydraulic diameter of the second hole, said ratio (x) is at least equal to 1.

5 14. The gas burner (1) according to claim 13, characterized in that said ratio (x) is at least equal to 2.

15. The gas burner (1) according to claims 1 and 8, characterized in that once a ratio (y) has been 10 defined, equal to the distance between the barycentre of a first nozzle of the series of nozzles (20) and the barycentre of a second nozzle of the series of nozzles (20), divided by a minimum diameter selected from an internal hydraulic diameter of the first nozzle and an 15 internal hydraulic diameter of the second nozzle, said ratio (y) ranges from 1 to 10.

16. The gas burner (1) according to claim 15, characterized in that said ratio (y) ranges from 2 to 5.

20 17. The gas burner (1) according to claims 2, 9 and 10, characterized in that once a ratio (z) has been defined, equal to the distance between the barycentre of a hole of said at least two holes (21) and the barycentre of a nozzle of said series of nozzles (20), 25 divided by a minimum diameter selected from a hydraulic

-21-

diameter of the hole and an internal hydraulic diameter of the nozzle, said ratio (z) ranges from 1 to 50.

18. The gas burner (1) according to claim 17, characterized in that said ratio (z) ranges from 3 to 5 30.

19. The gas burner (1) according to claim 5, characterized in that said cavity (34) has an outer diameter (Da2), an internal diameter (Da1) and a depth (La1), once a ratio (s) has been defined between the 10 depth (La1) of the cavity (34) and the internal diameter (Da1) of the same, said ratio (s) ranges from 0 to 5.

20. The gas burner (1) according to claim 19, characterized in that the outer diameter (Da2) of said 15 cavity (34) is greater than the internal diameter (Da1) of the same.

21. The gas burner (1) according to claim 19, characterized in that said ratio (s) ranges from 0 to 1.5.

20 22. The gas burner (1) according to claim 1, characterized in that said main metal body (6) comprises an internal coating (4) made of a refractory material and an insulator (3) made of fiber.

23. The gas burner (1) according to claim 1, 25 characterized in that it comprises at least two side

-22-

protections (7) for said at least two outer lances (10) for the combustible gas.

24. The gas burner (1) according to claim 1, characterized in that said protections (7) are applied 5 to the main metal body (6).

25. The gas burner (1) according to claim 1, characterized in that it comprises a perforated flange (5) for supporting said at least two outer side lances (10).

10 26. The gas burner (1) according to claim 1, characterized in that said burner comprises a central hole (19) having a hydraulic diameter, said central inner lance (11) having an outer diameter, having defined a ratio (k) between the hydraulic diameter of 15 the hole (19) and the outer diameter of the lance (11), said ratio (k) ranges from 0.3 to 3.

27. The gas burner according to claim 26, characterized in that said ratio (k) ranges from 0.5 to 1.5.

20 28) The gas burner according to claims 8 and 10, characterized in that the base surface of the second region (32) and the base surface of the third region (33) of the refractory unit (30) are level and aligned.

29. The gas burner according to claim 28, 25 characterized in that the base surface of the second

-23-

region (32) and the base surface of the third region (33) of the refractory unit (30) are aligned with an internal wall (70) of the oven.